Successful Aging: The Relationship Between Expectations Regarding Aging, Health-Promoting Behaviors, and Subjective Health Status

By

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Submitted to the graduate degree program in Clinical Psychology and the Graduate Faculty of the University of Kansas in partial fulfillment of the requirements for the degree of Master of Arts.

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Date Defended: August 21, 2015

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Abstract

As our population ages, there will be an increasing number of individuals affected by dementia, including Alzheimer's disease (AD). Individuals are being encouraged to use health-promoting resources and to participate in a healthy lifestyle to promote physical and mental health while aging. The present study examined how expectations regarding aging and lifestyle habits relate to successful aging outcomes in older adults. We collected data from 18 older adults with mild AD (13 men, 5 women) and 143 older adults without AD (96 women, 47 men) who ranged in age from 60 to 96 years old, with a mean age of 74.6 years old. All participants completed a background information form, the Expectations Regarding Aging (ERA-38) survey, the Health-Promoting Lifestyle Profile II (HPLP-II), and the RAND Medical Outcomes Study Survey Short-Form (RAND-36). Expectations were a significant predictor of engagement in health-promoting behaviors, with more positive expectations being associated with more engagement in health-promoting behaviors (HPLP-II total score), but engagement in health-promoting behaviors did not mediate the relationship between expectations and health outcomes. Expectations were also a significant predictor of engagement in physical activity (HPLP-II Physical Activity subscale score), as well as physical functioning (RAND-36 Physical Functioning subscale score), with more positive expectations being associated with more engagement in physical activity and better physical functioning. Physical activity partially mediated the relationship between expectations regarding aging and self-reported physical functioning, with the predictors accounting for 29.2% of the variance in physical functioning.

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As our population ages, there will be an increasing number of individuals affected by dementia, including Alzheimer's disease (AD). As of 2014, an estimated 5.2 million Americans have AD (Hebert, Weuve, Scherr, & Evans, 2013). Estimates from the nationally representative Aging, Demographics, and Memory Study (ADAMS) suggest that around 13.9 percent of people age 71 and older have some type of dementia (Plassman et al., 2007). Individuals are being encouraged to use health-promoting resources and to participate in a healthy lifestyle to promote physical and mental health while aging (Alzheimer's Association, 2014). For the purposes of this study, we examined how expectations regarding aging and lifestyle habits relate to successful aging outcomes in older adults.

Successful Aging

The multidimensional concept of successful aging refers to the maintenance of physical health, mental health, and social well being as one ages. Rowe and Kahn (1997) developed a widely accepted model of successful aging, where they defined successful aging as the maintenance of a) a high level of physical and mental functioning, b) a low probability of disease and disability, and c) an active engaging lifestyle. However, Rowe and Kahn's model distinguishes between unsuccessful and successful aging based on the health of the older adult; those who age successfully are those without chronic illnesses or diseases. Therefore, older adults who have a chronic illness cannot be classified as successful agers (Rowe & Kahn, 1997). Although their model is limited in its exclusion of individuals with diseases categorizing them as unsuccessful agers, their three-component definition is still a valuable framework from which to build a more encompassing model of successful aging. An inclusive model would include the

majority of older adults who are not completely free of disease, physical limitations, or chronic health challenges. Because we are interested in studying older adults with AD, it is important that we view successful aging as a goal that all individuals can work towards, despite having a chronic illness or disease such as AD.

Kahana, Kahana, and Kercher (2003) developed another model of successful aging that emphasizes proactive responses to stressors that impact quality of life. Their model largely focuses on the behavioral components of successful aging. Their model differs from Rowe and Kahn's model because it assumes that all individuals have the potential to age successfully, despite having a chronic illness or disability. They believe that individuals can behave proactively to prevent physical, environmental, social, and psychological stressors from having adverse effects on their quality of life (Kahana et al., 2003). Proactive changes include engaging in physical activity, making plans regarding future care, and building a social support structure. They include specific steps for how individuals with chronic illnesses can become successful agers. Their model of successful aging is a more inclusive model, which is essential because most aging individuals are impacted by chronic illnesses and disability, with two out of three older American being affected by multiple chronic conditions (Center for Disease Control and Prevention, 2013). By envisioning successful aging as a modifiable process that can be impacted by positive changes, successful aging as a goal is more accessible to the majority of older adults who do or will suffer from a chronic illness or disability.

Although we are choosing to work from the aforementioned theoretical models of successful aging, the definition of successful aging is still being debated and is typically based on the research questions being asked. When examining a construct as broad as successful aging, it is important to consider all of the aspects of successful aging including objective health,

psychosocial factors (i.e. adaptation, meaningful relationships and social connectedness), as well other subjective dimensions of health (Jeste, Depp, & Vahia, 2010; Pruchno, Wilson-Genderson, Rose, & Cartwright, 2010). Phelan and Larson (2002) further examined the components of successful aging and they identified seven elements including life satisfaction, longevity, freedom from disability, mastery/growth, active engagement with life, high/independent functioning, and positive adaptation. Because there are currently many varying definitions of successful aging, it is important to remember what function the definition serves. We believe it is important to use a definition that aids us in developing interventions aimed at improving individuals' functioning across the domains that are suspected to contribute to successful aging. Thus we are interested in researching effective ways to target and improve physical, functional, psychological, and social health.

More research needs to be conducted on how older adults perceive successful aging, so that researchers can work to incorporate their values into the definition of successful aging (Phelan & Larson, 2002). Also, because we are interested in studying successful aging in older adults with AD, it is important to examine how older adults with disease or disability view successful aging and to determine if their views differ from those who do not suffer from a chronic disease or disability. Finally, when attempting to intervene on health behaviors at an individual level, it is important to understand and acknowledge the external factors that have contributed to any individual's ability to achieve successful aging. These social determinants of health are not often addressed in interventional research, but because they largely influence health and health behaviors and contribute to systematic differences in health outcomes, it is becoming increasingly more important to inquire about how social inequities have influenced individuals' health (Katz & Calasanti, 2015).

Health Behaviors and Health Outcomes in Older Adults

Modifiable health behaviors play an important role in the improvement of health. Myint et al. (2011) found that there was a strong relationship between individual health behaviors (non-smoking, physical activity, moderate alcohol consumption, consumption at least 5 portions of fruits and vegetables per day) and health expectancy in middle to older aged adults. This study demonstrated that small changes in health behaviors could produce substantial benefits.

There is now an abundance of evidence that physical activity is important to health, including the health of older adults. Warburton, Nicol, and Bredin (2006) summarized the vast amount of literature demonstrating the health benefits of physical activity. Regular physical activity is effective in the primary and secondary prevention of several chronic diseases including cardiovascular disease, diabetes, cancer, hypertension, obesity, depression and osteoporosis. They also identified a linear relationship between physical activity and health status, such that increased amounts of physical activity and reduced time spent sedentary lead to more improvements in health.

Dogra and Stathokostas (2012) found that engagement in physical activity combined with a reduction in time spent engaging in sedentary behaviors was related to successful aging, as defined by Rowe and Kahn. They measured successful aging across three domains of health including physical health (i.e. functional impairment), psychological health (i.e. cognitive function, emotional vitality, and depression), and sociological health (i.e. engagement with life, social support, and spirituality). Those who were active or moderately active, measured by hours spent walking per week, were more likely to be classified as healthy in all three domains and were considered to be aging successfully, as opposed to being inactive and aging poorly. Individuals who were either moderately or the least sedentary, as measured by hours spent sitting

per day, were also more likely to be classified as aging successfully, as compared to those who were sedentary (Dogra & Stathokostas, 2012).

Researchers have also examined the benefits of physical activity in samples of older adults with AD. In one study, researchers found that older adults who engaged in higher levels of daily physical activity were at a lower risk for developing AD (Buchman et al., 2012). Wen et al. (2011) and colleagues demonstrated that older adults with and without disabilities benefitted from minimal increases in physical activity, leading to reduced all-cause mortality. They noted that, although healthy individuals tend to exercise more, individuals with chronic health risk factors and conditions can still experience improvement in health (Wen et al., 2011). Larson et al. (2006) demonstrated the association between engagement in regular physical activity and the delayed onset of AD, further supporting the importance of physical activity in older adult populations. The relationship between vigorous physical activity and reduced risk for dementia has also been examined. Bowen (2012) found that vigorous activity might reduce the risk of developing AD, after accounting for demographic characteristics, genetic factors, other health behaviors, BMI, and other chronic health conditions. This suggests that vigorous physical activity may reduce cognitive risk factors that are symptomatic of dementia (Bowen, 2012). Although there is evidence that demonstrates the health benefits of physical activity in older adults with and without AD, we still do not know the direction of the relationship; exercising might positively impact health, but individuals who are healthier may be more likely to exercise regularly.

Numerous other factors influence individuals' engagement in health-promoting behaviors. Many of these factors were summarized in a meta-analysis performed by Yarcheski, Mahon, Yarcheski, and Cannella (2004). They found that demographic variables such as age,

sex, education, income, and marital status had the smallest effect sizes. Loneliness and perceived social support had the strongest effect sizes followed by perceived health status, self-efficacy, future time perspective, self-esteem, hope, depression, and stress (Yarcheski et al., 2004). Other psychological factors that are related to health and health-promoting behaviors are health awareness, optimism, motivation, and internal control (Snell & Johnson, 1997). However, for the purposes of this study we focused on the influence of expectations regarding aging on health-promoting behaviors and health status.

Expectations Regarding Aging

Expectations regarding aging (ERA) can be defined as the expectations that a person has related to how well they will maintain their physical and cognitive health as they age (Sarkisian, Hays, Berry, & Mangione, 2002). These expectations can be used as an indicator of how successfully someone expects to age. Unfortunately, most older adults do not expect to age successfully (Sarkisian, Hays, & Mangione, 2002). Because expectations are cognitive constructs that are created around the context of an individual's life, they are likely modifiable. Bardach, Gayer, Clinkinbeard, Zanjani, and Watkins (2010) used a positive aging intervention to improve individuals' expectations regarding aging. After participants were exposed to the idea of positive aging through the presentation of descriptive stories and photos of people who were aging positively, their expectations regarding aging improved, as indicated by higher scores on the Expectations Regarding Aging-38 (ERA-38) survey. The stories were brief descriptions of older adults ages 66 to100 who were aging successfully. The researchers hypothesized that participants would examine their expectations regarding aging and vision of themselves as an aging individual, and compare it to the successful agers described in the stories. By simply presenting a healthy view of aging, individuals scored higher on the ERA-38 indicating that they endorsed

more positive expectations after the intervention (Bardach et al., 2010). Older individuals with more positive expectations regarding aging have also been shown to be happier later in life (Holahan, Holahan, Velasquez, & North, 2008). Holahan et al. (2008) found that the expectations that individuals held at age 60 predicted how happy they would be years later.

There is a growing body of literature that supports the link between individuals' expectations regarding aging and physical health outcomes and mortality (Levy, Slade, Kunkel, & Kasl, 2002; Prohaska, Keller, Leventhal, & Leventhal, 1987; Rakowski & Hickey, 1992; Sarkisian et al., 2002; Sarkisian, Liu, Ensrud, Stone, Mangione, & Group, 2001; Sarkisian, Prohaska, Wong, Hirsch, & Mangione, 2005). Levy et al. (2002) demonstrated that positive expectations regarding aging are associated with better physical functioning while aging, as well as increased longevity. Positive expectations regarding aging were also related to better self-reported physical and mental health (Kim, 2009). Further examination of the relationship between expectations and health revealed that the relationship was partially mediated by engagement in health-promoting behaviors such as physical activity, stress management, and interpersonal relations (Kim, 2009). Self-perception of aging can also influence individuals' engagement in other health-promoting behaviors such as having regular physical examinations, eating a healthy balanced diet, limiting use of alcohol and/or tobacco, and participating in exercise, as well as their use of healthcare resources (Levy & Meyers, 2004). More specifically, positive self-perceptions were associated with an increased likelihood of having a physical examination in the last 2 years as well as increased participation in physical activity, specifically strenuous physical activity (Meisner & Baker, 2013; Meisner, Weir, & Baker, 2013). However, this relationship has not been examined in older adults with AD.

Previous research has also shown that individuals that maintain negative age-related expectations underestimate their ability to engage in physical activity, thus accepting a more sedentary lifestyle (O'Brien Cousins, 2000, 2003). Similarly, older adults who believe that aging results in inevitable physical deterioration disengaged in physical activity (O'Brien Cousins, 2000, 2003). Sarkisian et al. (2005) examined the relationship between aging expectations and physical activity and found a significant positive association between aerobic activity and positive expectations regarding aging; those with more negative expectations were less likely to report engaging in physical activity. Therefore, negative expectations regarding aging may act as a barrier to physical activity in this population (Sarkisian et al., 2005).

Resnick, Palmer, Jenkins, and Spellbring (2000) examined older adults' efficacy expectations as it related to their ability to participate in physical activity despite facing challenges and barriers. They found that efficacy expectations were related to older adults' adherence to an exercise program consisting of 20 minutes of continuous aerobic exercise three times a week for three months. However, they also noted that efficacy expectations were related to exercise behavior indirectly, with outcome expectancy (i.e. belief that exercise will have positive effects on health as well as knowledge of the benefits it provides) helping to explain this relationship. Their study demonstrates the importance of older adults' perception of their ability to engage in physical activity (i.e. self-efficacy), as well as their knowledge of the health-related benefits exercise can provide.

Rationale for the Study

With the population of older adults growing rapidly, there is a growing body of literature reflecting the need for strategies that can promote successful aging in older adults. The present study addressed components of successful aging such as health status and health-promoting

behaviors, as they are related to expectations regarding aging. The goal of this study was to understand older adults' expectations regarding aging, as well as how their expectations influence health-promoting behaviors and subjective health status. We studied healthy older adults as well as older adults with Alzheimer's disease, because of the increasing percentage of the population that will be affected by some type of dementia. We loosely adopted the three component framework of successful aging developed by Rowe and Kahn (1997) and have further refined our definition of successful aging using the proactive response model developed by Kahana et al. (2003). By understanding the relationship between expectations regarding aging, health-promoting behaviors, and subjective health status, we can better understand the importance and impact of expectations regarding aging in a sample of older adults with and without AD. This information will be useful for the development of an intervention aimed at modifying negative expectations regarding aging to increase engagement in health-promoting behaviors (e.g. receiving medical care and engaging in physical activity).

Although it was our hypothesis that expectations regarding aging impact health-promoting behaviors, which in turn impact health outcomes and health status, cross sectional studies such as ours cannot establish causality. There is the possibility of reverse causality, meaning that individuals who are healthier engage in more health promoting behaviors, producing positive expectations regarding aging. We examined the relationship between expectations, health behaviors, and health status to first establish how these variables relate to one another in this population. Future longitudinal research could be conducted to establish the order of thoughts and behaviors.

Hypotheses

In this preliminary study we were interested in examining expectations regarding aging in particular, because they are likely modifiable. The study was largely exploratory because the goal was to identify and examine the relationship between expectations regarding aging, engagement in health-promoting behaviors, and subjective health status. It is imperative that we examine and understand older adults' expectations regarding aging because their expectations impact their willingness to engage in preventative health-promoting behaviors that can make successful aging a realistic achievable goal (Sarkisian et al., 2002). It is particularly important to examine this relationship in older adults with AD because of the increasing prevalence of the disease and the lack of previous research in this population. We hypothesized that positive expectations regarding aging would be associated with more engagement in health-promoting behaviors, which would influence subjective health status. We also hypothesized that engagement in health-promoting behaviors would mediate the relationship between expectations regarding aging and subjective health status (see Figure 1).

Method

Participants

Study participants were recruited from a pool of prior research participants from the University of Kansas Alzheimer's Disease Center (KUADC) Registry, who gave consent to be contacted for future studies. These individuals were contacted by mail and by phone. All participants had a Clinical Dementia Rating (CDR) score of less than 2. The CDR is a five-point scale that classifies individuals as "normal" (0), "very mild dementia" (0.5), "mild dementia" (1), "moderate dementia" (2), and "severe dementia" (3) (Morris, 1993). The rating scale assesses individuals' level of functioning on a number of domains including long-term and short-term

memory, current mental status, judgment and problem solving abilities, and tasks of daily living (Morris, 1993). All participants had been previously deemed capable of providing consent in past research studies.

We mailed out surveys to 319 potential participants (86 with AD and 233 without) and received responses from 18 older adults with AD (13 men, 5 women) and 143 older adults without AD (96 women, 47 men) who ranged in age from 60 to 96 years old, with a mean age of 74.6 years old. The majority of participants described their racial or ethnic identification as Caucasian (95.03%), followed by Black/African America (3.10%), Asian (1.20%), and Hispanic (0.60%). All of the participants with AD described their employment status as "retired" and the majority of participants without AD described their employment status as "retired" (53.80%), followed by "volunteer regularly" (27.30), and "currently employed" (18.90%). All of the participants without AD, and most of the participants with AD (61.10%), reported that they completed the surveys themselves, without the help of their spouse or caregiver.

Table 1

Mean Age and Years of Education for Participants with and without AD

Variable	Total (N=161)	No AD (n=143)	AD (n=18)
Age	M=74.61 (SD=7.36)	74.37 (SD=7.24	76.50 (SD=8.23)
Education (Years)	M=16.05 (SD=2.56)	M=16.10 (SD=2.54)	15.61 (SD=2.81)

Table 2

Distribution of Participants According to Sociodemographic Categories

	% of Total (N=161)	% of AD % (n=18)	% of No AD (n=143)
Race/Ethnicity			
Caucasian/White	95.03	94.40	95.10
African American/Black	3.10	5.60	2.80
Asian	1.20	0.00	1.40
Hispanic	0.60	0.00	0.70
Sex			
Female	62.70	27.8	67.10
Male	37.30	72.2	32.90
Employment			
Retired*	59.00	18.00	53.80
Volunteer Regularly*	24.20	0.00	27.30
Currently Employed*	16.80	0.00	18.90
Survey Completion*			
Participant	95.70	61.10	100.00
Spouse/Caregiver	4.30	38.90	0.00

Note: * = Significantly different for AD and No AD groups ($p \leq .001$)

Measures

Background Information Form. A background information form was used to collect participants' demographic information such as age, sex, education, ethnicity, employment status, and dementia status. Participants were also asked to identify who filled out the surveys by indicating whether they filled them out by themselves or if a caregiver or spouse aided them.

Geriatric Depression Scale. The Geriatric Depression Scale (GDS) was designed to screen for depression in older adults. The 30-item scale covers many symptoms of depression including somatic complaints, cognitive complaints, motivation, self-image, agitation, and mood. The statements are followed by two responses: "Yes" and "No" (Yesavage et al., 1983). Higher scores indicate more reported symptoms of depression with scores of 0-9 being considered normal, scores of 10-19 indicating mild depression, and scores of 20-30 indicating severe

depression. An alpha coefficient of 0.94 and a split-half reliability coefficient of 0.94 suggest that the survey has a high degree of internal consistency. The GDS is highly correlated with the Zung Self-Rating Depression Scale (r = 0.84) and the Hamilton Rating Scale for Depression (r = 0.83), providing evidence for convergent validity (Yesavage et al., 1983). The GDS has a Flesch-Kincaid reading level of grade 3.6.

Expectations Regarding Aging Survey. The Expectation Regarding Aging (ERA-38) survey includes 38 questions related to physical and cognitive health as well as independence related to activities of daily living. The ERA-38 was designed to measure the extent to which individuals expect to experience age-associated decline (Sarkisian et al., 2002). The survey addresses many domains including sleep and fatigue, pain, sexual function, urinary incontinence, and physical appearance. The statements are followed by four responses: ‘‘Definitely True,’’ ‘‘Somewhat True,’’ ‘‘Somewhat False,’’ and ‘‘Definitely False.’’ Possible scores range from 0-100, with higher scores indicating a higher expectation to achieve successful aging and lower scores indicating expected physical and mental decline (Sarkisian et al., 2002). Internal consistency alpha coefficients for the subscales measured by the ERA-38 range from 0.73-0.94, with exception of the Pain subscale ($\alpha = 0.58$). The Functional Independence subscale scores correlate with the Medical Outcomes Study Short Form-12 (SF-12) Physical Component Summary (PCS-12) scores (r = 0.30), demonstrating construct validity. The ERA-38 Mental Health subscale scores also correlated with the SF-12 Mental Component Summary (MCS-12) scores (r = 0.40) and were inversely related to scores on the Geriatric Depression Scale and age (Sarkisian et al., 2002). The ERA-38 did not highly correlate with any other measure of health-related quality of life with correlation coefficients less than or equal to 0.35, suggesting that the survey captures a

different construct (Sarkisian et al., 2002). The ERA-38 has a Flesh-Kincaid reading level of grade 5.8.

Health-Promoting Lifestyle Profile II. The Health-Promoting Lifestyle Profile II (HPLP-II) consists of 52 questions related to current engagement in health-promoting lifestyle factors such as spiritual growth, interpersonal relations, nutrition, physical activity, health responsibility, and stress management. Each statement on the survey is followed by four responses: "Never," "Sometimes," "Often," and "Routinely" (Walker & Hill-Polerecky, 1996). Individual responses are scored on a one to four scale, with the overall score being obtained by averaging all of the responses. The subscale scores are also obtained by averaging the responses to the subscale items. Factor analysis confirmed the six-dimensional structure of the HPLP-II (Walker & Hill-Polerecky, 1996). The HPLP-II is correlated with the Personal Lifestyle Questionnaire ($r = 0.68$), demonstrating convergent validity and it is not significantly correlated with social desirability, demonstrating divergent validity. The HPLP-II has an alpha coefficient of 0.94 and the subscales have alpha coefficients ranging from 0.79 to 0.87, suggesting that the measure and its subscales are internally consistent (Walker & Hill-Polerecky, 1996). The HPLP-II has a Flesh-Kincaid reading level of grade 7.3.

RAND 36-Item Health Survey. The RAND 36-Item Health Survey (RAND-36) is a measure of health-related quality of life, which refers to how health affects general functioning and perceived physical, mental, and social well-being. The survey consists of eight subscales including physical functioning, role limitations caused by physical health problems, role limitations caused by emotional problems, social functioning, emotional well-being, energy/fatigue, pain, and general health perceptions. The eight subscale scores yield two summary scores that more generally measure physical and mental health. General function is

measured by assessing engagement in basic self-care activities (e.g. bathing) as well as engagement in work-related activities (e.g. housework or job). Questions related to physical, mental, and social well-being assess the individual's subjective perception of their well-being in the related domain (e.g. whether the individual feels happy or whether they are in pain) (Hays & Morales, 2001). The RAND-36 survey's alpha values ranging from 0.71 to .93, suggesting the measure and its subscales are internally consistent (VanderZee, Sanderman, Heyink, & de Haes, 1996). Confirmatory factor analysis confirmed the dimensions of the survey; most of the items' highest factor loadings were consistent with the scales that the items belong to. However, items on the Social Functioning scale and the Vitality scale had items that loaded higher on other related subscales (VanderZee et al., 1996). The structure of the two orthogonal higher-order factors (physical and mental health) has also been confirmed (Hays & Morales, 2001; McHorney, Ware, & Raczek, 1993). The RAND-36 has a Flesh-Kincaid reading level of grade 5.8.

Procedure

Potential participants who were previously been deemed capable of providing consent were mailed a letter from the director of the ADC asking potential participants to consider participating in the study. They also received a letter that informed participants of the main purpose of the research, gave a general description of the research question, and contained the researchers' contact information. Participants were encouraged to contact the researchers if they had any questions regarding the study. They also received a consent form and the study materials, including a background information form and the four measures.

Individuals who decided to participate were asked to read and sign the consent form. Only participants who were previously diagnosed with AD, mild cognitive impairment, or

probable AD were asked if their expectations regarding aging changed after receiving their dementia diagnosis. They were also asked five questions about how their expectations changed because of their diagnosis. All participants completed a background information form, the Expectations Regarding Aging (ERA-38) survey, the Health-Promoting Lifestyle Profile II (HPLP-II), and the RAND Medical Outcomes Study Survey Short-Form (RAND-36). Participants sent their signed consent form and the completed study materials back to the researchers using a preaddressed prepaid envelope.

The researchers received phone calls from interested participants and all questions were answered. Four weeks after the study materials were mailed out to participants, potential participants with AD, mild cognitive impairment, or probable AD were contacted by phone, because of their low spontaneous response rate, as compared to those without AD. We reminded them of the study, discussed their potential participation, and answered any questions that they had.

When we received study materials from individuals who chose to participate, the returned documents were checked to ensure that all participants who have returned completed study materials had also signed the consent form. Individuals who returned the study materials without a signed consent form were contacted by phone to discuss the issue and they were mailed a new consent form. Those individuals who returned the surveys, but did not return a consent form, were excluded from the study.

Ethical Considerations. A university institutional review board approved the study. Participants were informed of the purpose of the study, the risks and benefits, and their right to withdraw. They were given the researchers' contact information to facilitate communication and to allow participants to ask questions. All participants gave informed consent.

Data Analyses

Descriptive statistics including means, standard deviations, and ranges were calculated for the continuous variables and percentages and frequencies were calculated for the dichotomous variables (see Tables 1, 2, and 3). All assumptions for linear regression were tested and met for the total scores and subscale scores used in the analyses.

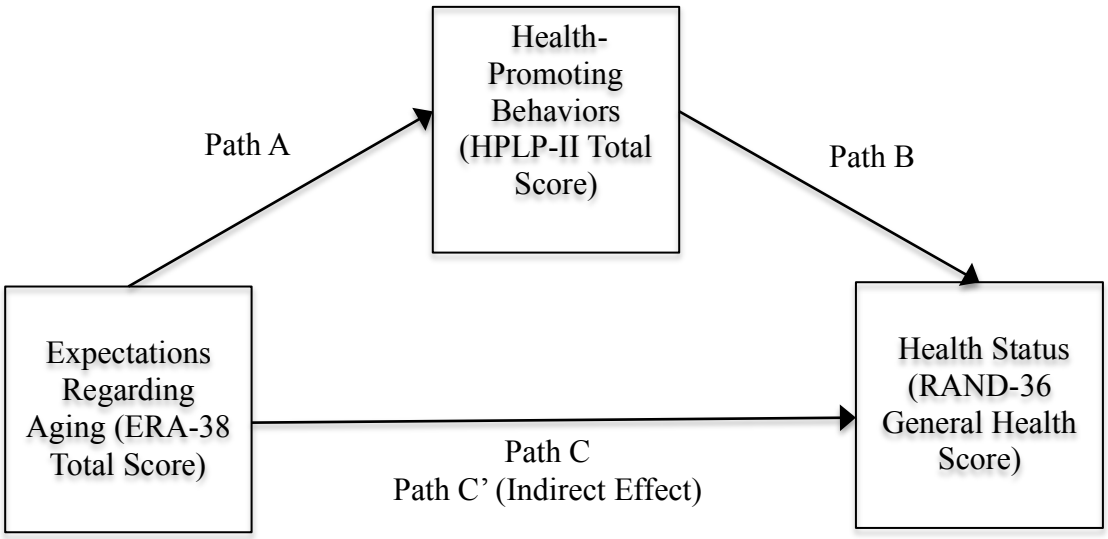
All analyses including the regression-based mediation analyses were conducted in SPSS (Version 22). Mediation analyses were conducted using Hayes' (2012) mediation macro PROCESS. In mediation models, it is expected that the indirect effect coefficient and some test of significance will demonstrate that the proposed mediator and predictor variable together explain more of the variance in the outcome variable, as compared to the variance explained by just the predictor variable. If more of the variance is explained because of the inclusion of the proposed mediator and the variance explained by just the predictor is reduced, the mediator is said to be statistically significant (Baron & Kenny, 1986; Hayes, 2012). For this study, bootstrapped confidence intervals were used to test the significance of the indirect effects, because bootstrapping makes fewer assumptions about the shape and normality of the sampling distribution of the indirect effect and because it is more powerful than the Sobel test (Hayes, 2012).

We examined whether health-promoting behaviors mediated the relationship between expectations regarding aging and health status, while adjusting for age, sex, education, ethnicity, employment status, dementia status, and level of depression (see Figure 1.). A series of multiple regression analyses were performed to test the mediating effect of engagement in health-promoting behaviors on the relationships between expectations regarding aging and subjective health status. First, the proposed mediator, health-promoting behaviors, was regressed onto the

predictor variable, expectations regarding aging (Path A). Then, the outcome variable, subjective health status was regressed onto the proposed mediator, health-promoting behaviors (Path B). Lastly, the outcome variable subjective health status was regressed onto the predictor, expectations regarding aging to demonstrate the relationship between expectations regarding aging and subjective health status (Path C). To test the indirect effects of the hypothesized mediation model, we used bootstrapping (N = 5,000 samples) (Path C').

Figure 1

Hypothesized Mediation Model: Mediating Effect of Health-Promoting Behaviors on the Relationship Between Expectations Regarding Aging and Health Status



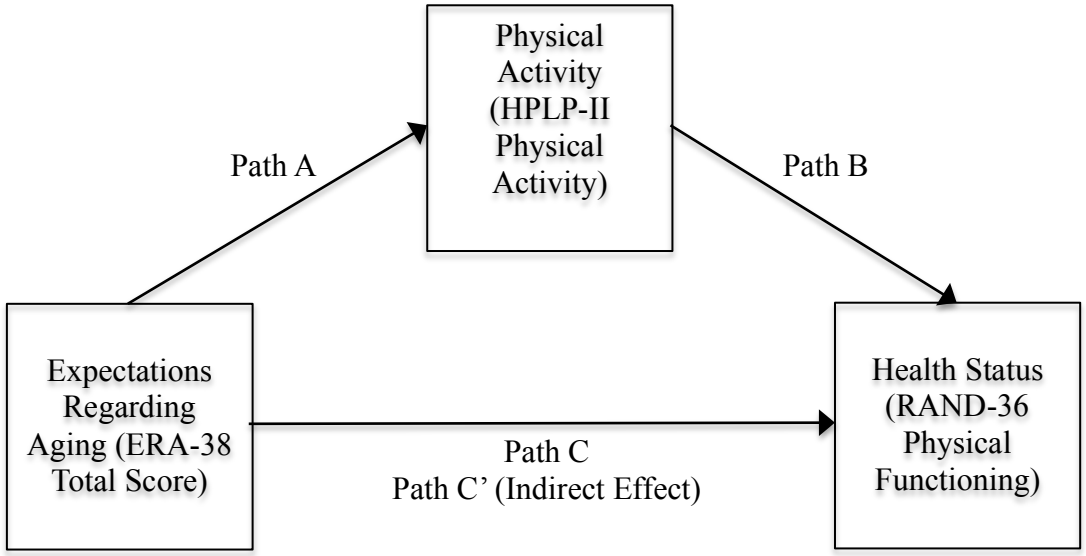
We also examined whether engagement in physical activity mediated the relationship between expectations regarding aging and physical functioning using the same multiple regression mediation analysis procedure (Preacher & Hayes, 2004). This post-hoc mediation analysis was conducted based on the literature that supports the relationship between physical activity and health outcomes in older adults with and without AD (Bowen, 2012; Buchman et al.,

2012; Kim, 2009; Larson et al., 2006; Meisner et al., 2013; Wen, 2011). This hypothesized mediation model can be found below (see Figure 2).

First, the proposed mediator, physical activity, was regressed onto the predictor variable, expectations regarding aging (Path A). Then, the outcome variable, physical functioning was regressed onto the proposed mediator, physical activity (Path B), and the predictor variable, expectations regarding aging (Path C). To test the indirect effects of the hypothesized mediation model, we used bootstrapping (N = 5,000 samples) (Path C').

Figure 2.

Hypothesized Mediation Model: Mediating Effect of Physical Activity on the Relationship Between Expectations Regarding Aging and Physical Functioning



Missing Data

Participants who did not respond to more than 10% of the total items on either the ERA-38, HPLP-II, or the RAND-36, with whole pages of any one survey missing, were excluded from the sample (n = 10). For the GDS, responses that were marked in between "Yes" and "No" were

coded as “Yes” responses. The responses were coded as “Yes” responses, because the participant endorsed the item, to some degree, because they did not choose the “No” response. Also, because the some items on the GDS are reversed scored, not all “Yes” responses result in an inflated GDS score. This rule was applied to 14 items across 10 participants. For all of the other surveys, responses that were marked in between two points on a Likert scale were coded using the less extreme response. This rule was applied to 14 items across 4 participants.

No missing data was imputed for missing scores on the GDS, because none of the participants were missing more than 10% of their GDS responses. Responses were imputed using the hot-deck imputation method for participants who were missing less than 10% of their data on the ERA-38 and the HPLP-II (Andridge & Little, 2010). Using the hot-deck method, missing items are replaced using responses found within the dataset; this method was used because the responses used to replace missing items represent reasonable possible responses, for this particular sample. Missing data is replaced using the scores of a matched participant; participants were matched based on sex, age, and level of depression. Up to 10% of missing responses on the ERA-38 surveys were replaced using the hot-deck method, which included 9 participants missing less than 3 responses each, with most participants missing only one response. Up to 10% of missing responses on the HPLP-II surveys were replaced using the same method, which included 26 participants missing less than 6 responses each, with most participants missing only one response. No missing responses on the RAND-36 were replaced, because RAND-36 scores are calculated based on the items the participant responded to. Overall, 0.2% of total cases were replaced using the hot-deck method of imputation.

Results

Mediation Analyses

All mediation analyses were conducted on the total sample (N=161), including participants with and without AD. The unstandardized regression coefficients and associated results are summarized in Table 3 found below. The total, direct, and indirect effect coefficients are also summarized below in Table 4.

Table 3

Results of the Mediation Analysis Examining the Effect of Health-Promoting Behaviors on the Relationship Between Expectations and Health Status

	Path A: Health Behaviors	Path B: General Health	Path C: General Health
Constant	1.736***	62.262***	67.127***
Expectations	0.015***	0.620***	0.663***
Health Behaviors	----------	2.803	----------
Depression	-0.036***	-1.261**	-1.362***
Employment (Unemployed=0, Employed=1)	0.009	0.206	0.230
Sex (Male=0, Female=1)	0.078	-0.649	-0.429
AD Status (AD=1, No AD=0)	0.038	-3.548	-3.443
Education (Years)	0.019	-0.695*	-0.640
Age (Years)	0.003	-0.104	-0.097
Minority Status (Caucasian=0, Minority=1)	0.032	-5.294	-5.206
F=	12.980***	12.442***	14.455***
R^2 =	0.341	0.457	0.457

*p ≤ .05; **p ≤ .01; ***p ≤ .001
NOTE: Unstandardized regression coefficients (*B*) reported.

Table 4

Total, Direct, and Indirect Effects of the Mediation Analysis Examining the Effect of Health-Promoting Behaviors on the Relationship Between Expectations and Health Status

	Effect	Lower Limit Confidence Interval	Upper Limit Confidence Interval
Total Effect	0.663***	0.423	0.906
Direct Effect	0.620***	0.372	0.868
Indirect Effect (C')	0.043	-0.030	0.134

*p ≤ .05; **p ≤ .01; ***p ≤ .001
NOTE: Indirect effect confidence interval is a bootstrapped estimate (5,000 samples).

Our results indicate that expectations regarding aging (ERA-38 total) was a significant predictor of engagement in health-promoting behaviors (HPLP-II total), $B = 0.015$, $SE = 0.004$, $t(152) = 3.952$, $p = .0001$, explaining a significant proportion of variance in HPLP-II total scores, $F(8,152) = 12.980$, $p < .0001$, $R^2 = 0.341$, $MSE = 0.138$, with more positive expectations being associated with more engagement in health-promoting behaviors. Expectations regarding aging (ERA-38 total) was also a significant predictor of health status (RAND-36 General Health subscale), $B = 0.663$, $SE = 0.121$, $t(152) = 5.467$, $p < .0001$, explaining a significant proportion of variance in RAND-36 General Health scores, $F(8,152) = 14.455$, $p < .0001$, $R^2 = 0.457$, $MSE = 148.366$, with more positive expectations being associated with better self-rated health. Health-promoting behaviors (HPLP-II total) was not a significant predictor of health status (RAND-36 total).

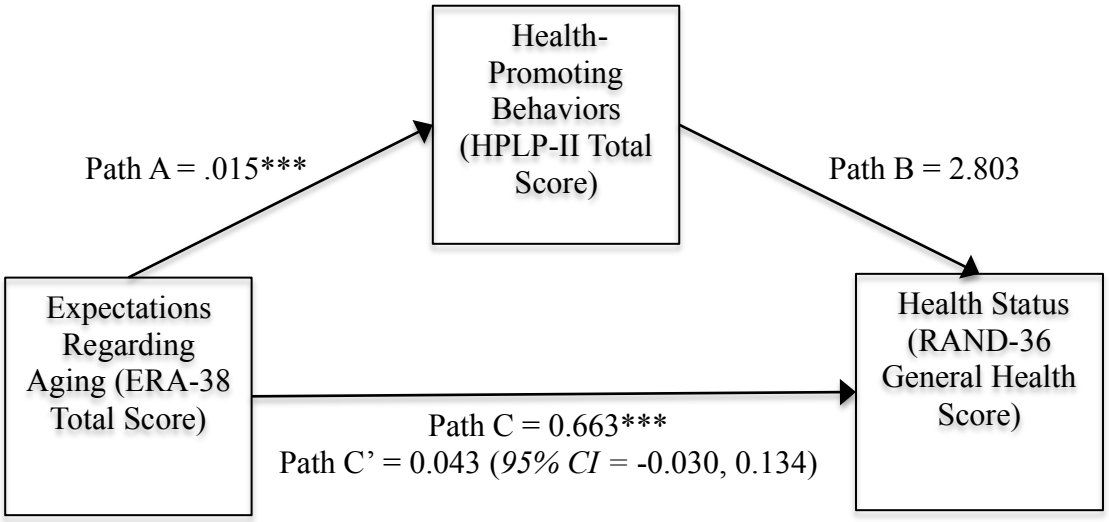
Other associations between the covariates, health-promoting behaviors, and general health can be found in Table 3. Notably, higher depression scores (GDS total) were significantly associated with less engagement in health-promoting behaviors and poorer general health. Higher education was also significantly associated with poorer health, when health-promoting

behaviors was included in the model. Those who identified as male or Caucasian also reported experiencing poorer general health, but this association was not statistically significant.

The indirect effect was tested using bootstrapping (N = 5,000 samples) and the indirect effect coefficient was also not significant, as evidenced by the confidence interval containing 0.0, *B* = .043, *SE* = 0.041, *95% CI* = -0.030, 0.134. Therefore, these results do not support our meditational hypothesis, because a non-significant Path C' means that the relationship between expectations regarding aging and health status is not explained by health-promoting behaviors.

Figure 3

Mediation Model: Relationship Between Expectations Regarding Aging, Health-Promoting Behaviors, and Health Status



*p ≤ .05; **p ≤ .01; ***p ≤ .001
NOTE: Unstandardized regression coefficients (*B*) reported for Paths A, B, and C. Indirect effect coefficient reported for Path C'.

A second mediation analysis was conducted post-hoc to determine whether engagement in physical activity (HPLP-II Physical Activity subscale) mediates the effect of expectations regarding aging (ERA-38 total) on physical functioning (RAND-36 Physical Functioning

subscale). The unstandardized regression coefficients and associated results are summarized in Table 5. The total, direct, and indirect effect coefficients are also summarized in Table 6.

Table 5. Results of the Mediation Analysis Examining the Effect of Physical Activity on the Relationship Between Expectations and Physical Functioning

		Path A: Physical Activity	Path B: Physical Functioning	Path C: Physical Functioning
Constant		1.449	134.663***	142.862***
Expectations (ERA-38)		0.017**	0.469**	0.566**
Physical Activity (HPLP-II)		----------	5.658**	----------
Depression (GDS)		-0.050**	-0.604	-0.885
Employment (Unemployed=0, Employed=1)		0.072	-0.673	-0.266
Sex (Male=0, Female=1)		-0.195	-7.261*	-8.363**
AD Status (AD=1, No AD=0)		-0.209	-3.608	-4.788
Education (Years)		0.005	-1.010	-0.982
Age (Years)		0.007	-0.962***	-0.923***
Minority Status (Caucasian=0, Minority=1)		-0.056	-8.744	-9.063
	F =	5.775***	8.291***	7.003***
	R^2 =	0.203	0.292	0.262

*p ≤ .05; **p ≤ .01; ***p ≤ .001
NOTE: Unstandardized regression coefficients (*B*) reported.

Table 6. Total, Direct, and Indirect Effects of the Mediation Analysis Examining the Effect of Physical Activity on the Relationship Between Expectations and Physical Functioning

	Effect	Lower Limit Confidence Interval	Upper Limit Confidence Interval
Total Effect	0.566**	0.220	0.912
Direct Effect	0.469**	0.126	0.812
Indirect Effect (C')	0.097^{+}	0.021	0.230

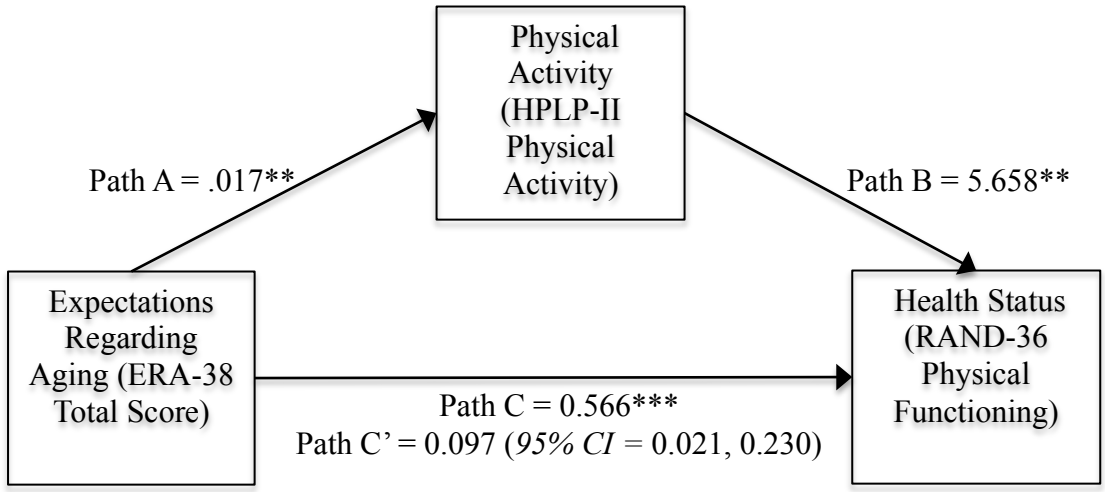
*p ≤ .05; **p ≤ .01; ***p ≤ .001; $^{+}$Significant indirect effect
NOTE: Indirect effect confidence interval is a bootstrapped estimate (5,000 samples).

Our results indicate that expectations regarding aging (ERA-38 total) was a significant predictor of engagement in physical activity (HPLP-II Physical Activity subscale), *B* = 0.017, *SE*

= 0.007, $t(152) = 2.565$, $p = .011$, explaining a significant proportion of variance in HPLP-II Physical Activity scores, $F(8,152) = 5.775$, $p < .0001$, $R^2 = 0.203$, $MSE = .455$, with more positive expectations being associated with more engagement in physical activity. Expectations regarding aging (ERA-38 total) was also a significant predictor of physical functioning (RAND-36 Physical Health subscale), $B = 0.566$, $SE = .175$, $t(152) = 3.232$, $p = .0015$, explaining a significant proportion of variance in RAND-36 Physical Functioning scores, $F(8,152) = 7.003$, $p < .0001$, $R^2 = 0.262$, $MSE = 349.265$, with more positive expectations being associated with higher levels of self-rated physical functioning. Expectations regarding aging (ERA-36 total) and engagement in physical activity (HPLP-II Physical Activity subscale) together predicted physical functioning (RAND-36 Physical Functioning subscale), $F(9,151) = 8.291$, $p < .0001$, $R^2 = .292$, $MSE = 336.932$, with HPLP-II Physical Activity scores explaining a significant proportion of variance in RAND-36 Physical Functioning scores, $B = 5.658$, SE = 1.938, $t(151) = 2.919$, $p = 0.004$; more positive expectations and more self-reported engagement in physical activity were associated with higher levels of self-rated physical functioning. ERA-36 total scores accounted for less of the variance in RAND-36 Physical Functioning scores, with the inclusion of HPLP-II Physical Activity scores, $B = .469$, $SE = 0.173$, $t(151) = 2.705$, $p < .008$. These results suggest that self-reported engagement in physical activity partially mediated the relationship between expectations regarding aging and self-reported physical functioning, with the predictors accounting for 29.2% of the variance in physical functioning. The indirect effect was tested using bootstrapping (N = 5,000 samples). These results indicated that the indirect effect coefficient was significant, $B = .097$, $SE = 0.051$, *95% CI* = 0.021, 0.230. This mediation analysis is significant because the confidence interval does not include 0.0. Therefore, we can say that we are 95% confident that the true indirect effect is positive. There is no reported p-value associated with the

indirect effect coefficient, because it does not meet the definition of a formal null hypothesis test (Preacher & Hayes, 2012).

Figure 4. Mediation Model: Relationship Between Expectations Regarding Aging, Physical Activity, and Physical Functioning



*p ≤ .05; **p ≤ .01; ***p ≤ .001
NOTE: Unstandardized regression coefficients (B) reported for Paths A, B, and C. Indirect effect coefficient reported for C'.

Exploratory Results for Participants with AD

AD status was not a significant covariate in any of the regression analyses conducted for either mediation model; this is likely due to the low number of participants with AD, but it important to note that we did not observe any significant differences in health behaviors between these groups.

Individuals with AD most frequently reported that it was "somewhat true" that their expectations changed after being diagnosed with AD and that they expect more age-related problems because of diagnosis; 22.2 % of individuals with AD indicated that their expectations "became more negative" and 22.2% indicated that they "became more positive." The majority of participants with AD reported that they do not expect more physical health problems because of

the diagnosis (61.1%), but they do expect more cognitive problems (61.1%) and they are less satisfied with their life because of the diagnosis (72.2%).

Discussion

We hypothesized that more positive expectations regarding aging would be associated with better self-reported health, with engagement in health-promoting behaviors mediating the relationship between these two variables. Our results demonstrated that more positive expectations regarding aging were associated with better self-reported health. Thus, older adults who expected fewer age-related health problems and had more positive expectations regarding aging viewed themselves as having better health in general. This finding supported the existing literature that has identified the link between expectations regarding aging and health outcomes (Levy et al., 2002; Prohaska et al., 1987; Rakowski & Hickey, 1992; Sarkisian et al., 2002; Sarkisian et al., 2001; Sarkisian et al., 2005). Results consistent with our hypotheses would suggest that expectations regarding aging predict health-promoting behaviors which predict health status; this information could then be used to design further studies and interventions structured around the modification of negative expectations regarding aging, in hopes of also improving engagement in health-promoting behaviors and health status. Longitudinal data would need to be collected to further examine the directions of the relationships between expectations, heath behaviors and health status. More research is needed to establish if healthy people engage in more health behaviors, or if people who engage in more health behaviors are healthier.

However, the results of this mediation model did not support our hypothesis that engagement in health-promoting behaviors would mediate the relationship between expectations and health status. Thus, we were not able to replicate a previous finding that suggested that health-behaviors mediates this relationship (Kim, 2009). There are a number of possible reasons

why engagement in health-promoting behaviors did not mediate this relationship. First, we used HPLP-II total scores as our indicator of general engagement in health-promoting behaviors. Although the HPLP-II total score was found to be the most reliable of the HPLP-II scores in our sample, a more specific subscale may better explain the relationship between expectations and health. The combination of a variety of different domains (i.e. spiritual growth, interpersonal relations, nutrition, physical activity, health responsibility, and stress management) may have made other subscale-specific results undetectable.

In the second mediation analysis conducted, we examined the relationship between expectations regarding aging, physical activity, and physical functioning. We conducted this mediation analysis because there is literature that supports the relationship between physical activity and health outcomes in older adults with and without AD (Bowen, 2012; Buchman et al., 2012; Kim, 2009; Larson et al., 2006; Meisner et al., 2013; Wen et al., 2011). We found that self-reported physical activity mediated the relationship between expectations regarding aging and physical functioning. This demonstrates that older adults who expected fewer age-related health problems and had more positive expectations regarding aging viewed themselves as having higher levels of physical functioning and participation in physical activity helped explain this relationship. This result may help inform future interventions aimed at improving older adults' physical functioning by increasing their level of engagement in physical activity. It suggests that it may be beneficial to help individuals develop more positive expectations regarding aging while helping them increase their physical activity, because expectations and engagement in physical activity together were a stronger predictor of better physical functioning than they were separately. This supports previous findings on the relationship between expectations regarding aging, physical activity, and health (Levy et al., 2002; Meisner & Baker, 2013; Meisner et al.,

2013; Sarkisian et al., 2002; Sarkisian et al., 2005). This gives further support to our hypothesis that expectations regarding aging plays a crucial role in older adults' engagement in health-promoting behaviors, specifically physical activity. Thus we continue to see the need for interventions that target cognitive constructs, such as expectations, along with strategies to increase physical activity in older adult populations. Psychoeducational interventions that help inform older adults about the health-related benefits of physical activity are also needed, because older adults who understand the benefits of regular exercise may be more likely to adhere to interventions aimed at increasing physical activity or decreasing sedentary time (Resnick et al., 2000).

We may have been successful at identifying a significant relationship between physical activity and physical functioning, because we used subscales scores and examined a specific health-promoting behavior and a specific health outcome. Using subscale scores may have helped us isolate a significant relationship that was undetectable when we used total scores, because the total scores consist of several distinct subscales that may contribute to health status differently. This suggests that the expectations regarding aging may impact physical functioning specifically via physical activity. This may make improving health and physical functioning a more manageable task; an individual may not need to make improvements to all of their health behaviors if we are able to identify specific health behaviors that have the most impact on health outcomes. This notion is supported by the literature examining the impact of specific health behaviors such as physical activity (Levy et al., 2002; Meisner & Baker, 2013; Meisner et al., 2013; Sarkisian et al., 2002; Sarkisian et al., 2005). Additionally, the ERA-38 measures expectations that can be described as domains of physical functioning (i.e. general health, cognitive functioning, mental health, functional independence, sexual functioning, pain, urinary

functioning, sleep, fatigue, and appearance), which may be why total scores on the ERA-38, in combination with physical activity, predict physical functioning.

Examining older adults' expectations as they relate to health behaviors can provide valuable information on how to design appropriate health-improving interventions for older adults. Hardy and Grogan (2009) conducted a qualitative study on personal and social influences on participation in physical activity. They found that older adults desire to engage in physical activity to preserve and improve their appearance and health, but few knew of the health benefits that regular exercise provides. Participants reported that they felt as though older adults' needs are overlooked, in favor or targeting younger generations and they mentioned being unable to find suitable facilities with appropriate exercise classes. Thus, examining older adults' expectations as they relate to health behaviors such as physical activity can provide useful information about making health-promoting services more available and approachable to older adults. Negative expectations may also be a good indicator of individuals who are at greater risk for health decline due to lack of engagement in health-promoting behaviors. If an individual's expectations are more negative, researchers and clinicians can help motivate individuals to engage in physical activity using factors that previous researchers have identified as motivating for older adults. Janssen and Stube (2014) identified both intrinsic and extrinsic factors that contributed to older adults' participation in physical activity. Older adults were motivated to exercise to maintain a sense of control over their health. Effective health educators who recommended manageable physical activity routines also helped motivated them, further identifying the need for clinicians who are educated about the needs of older adults (Janssen & Stube, 2014).

Because we were unable to establish the causal direction of the relationship between expectations regarding aging and physical health outcomes, it is important to note that engagement in physical activity may lead to more positive expectations. Cox et al. (2013) conducted a randomized control trial of the effects of a 6-month physical activity intervention on long-term participation in physical activity in older adults with memory complaints. They found that older adults who participated in the physical activity intervention experienced increased self-efficacy. Although expectations and self-efficacy are not synonymous, this research further highlights what is still unknown about the direct of the relationship between thoughts and behaviors.

The exploratory results of the questions posed only to the small subsample of participants with AD suggests that receiving a diagnosis of AD may negatively impact older adults expectations regarding aging, specifically their expectations about their cognitive health. The results also suggest that older adults with AD may not associate their diagnosis with being at risk for more physical health problems. Older adults with AD may be less satisfied with their lives because they have been diagnosed with AD, demonstrating the importance of psycho-educational interventions aimed at creating more positive expectations about the prognosis of their disease. However, in our sample, AD status did not significantly predict poorer subjective health status or participation in fewer health-promoting behaviors (see Tables 3 and 5), which is likely due to the small number of participants with AD.

Limitations

A limitation of this study is its cross-sectional design and its exploratory nature. Because the data were collected at a single time-point and there was no random assignment or experimental manipulation, causal inferences about the relationships between expectations

regarding aging, health-promoting behaviors, and subjective health status cannot be made. We cannot rule out reverse causality, so we are unable to draw conclusions about the direction of this relationship. Thus, we cannot determine if older adults with poorer health engage in fewer health-promoting behaviors or if older adults who engage in fewer health behaviors have poorer health as a result.

The study sample consisted of a disproportionate number of older adults without AD, which limits the generalizability of the results; we cannot draw conclusions or further examine the relationship between expectations regarding aging and subjective health status in older adults with AD, because of the low number of participants with AD. The sample was also largely made up of Caucasian females, further limiting the generalizability of the study results. The data is also likely reflective of some level of non-response bias, due to the data collection procedure and use of convenience sampling, because participants who responded likely have different characteristics than those who did not respond. Individuals that did not respond may have had poorer health, which may have generated a healthier sample than is representative of the overall population of older adults.

Future Directions

A future study looking at the mediating role of health behaviors in the relationship between expectations and health status longitudinally would help to establish possible causal associations in a larger sample of older adults with and without AD. It is important to determine whether older adults with AD have different expectations regarding aging, as compared to older adults without AD, to determine if an intervention aimed at modifying negative expectations regarding aging would be appropriate for both populations.

Our findings that suggest that the effect of expectations regarding aging on subjective health status is partially explained by self-reported engagement in physical activity highlights the importance of addressing both expectations regarding aging and engagement in physical activity when attempting to improve physical functioning. Interventions aimed at increasing physical activity in older adult populations may be more effective if an expectation-improving component is included. Several studies have demonstrated the efficacy of interventions aimed at increasing physical activity in older adults, but few have examined how also targeting expectations regarding aging may aid in improving outcomes or adherence. Additionally, not all older adults are equally benefitted in these interventions; by learning more about the relationship between expectations and health we may be able to more effectively increase health behaviors and physical activity in these specific subsets of the older adult population. One study conducted by Sarkisian, Prohaska, Davis, and Weiner (2007) demonstrated the effectiveness of teaching older adults to attribute sedentary behavior to modifiable attributes, instead of attributing these behaviors to old age, because older adults who have more negative expectations regarding aging (i.e. expect more age-related decline) are more likely to be sedentary (Sarkisian et al., 2005). After the 4-week attribution retraining intervention, they observed an increase in mean steps per week. Their intervention also increased expectations regarding aging and participants noted improvement in mood, pain, energy, and sleep (Sarkisian et al., 2007). This may be one reason why we found that older adults are less satisfied with their lives after having been diagnosed with AD. They may feel as though they can no longer positively influence their health, because of the disease. If clinicians and researchers could help older adults with AD identify health behaviors that they can control and influence, they may be more likely to engage in health behaviors that have been shown to improve health outcomes, such as physical activity.

Our exploratory results indicate that most of the participants with AD expect more cognitive problems and they are less satisfied with their life because of the diagnosis. Although AD does cause cognitive decline, it may be important to examine whether older adults' expectations regarding their prognosis are more negative than is realistic, or whether this change in expectations is adaptive. Research on ways to increase acceptance of the disease while encouraging realistic expectations has the potential to greatly benefit individuals and their caregivers. In a qualitative study examining older adults with somatic health problems, Helvik, Iversen, Steiring, and Hallberg (2011) found that participants were most concerned with maintaining control and balance in their lives. They noted that participants adjusted their expectations to their physical abilities, so that they could maintain a sense of control over their lives. Participants also reported that they tried to be reasonable with their expectations, while trying to remain rational, in an attempt to avoid feeling depressed about their changing health (Helvik et al., 2011). It may be important to examine older adults' expectations as a way to identify those who may be at increased risk for depression or lack of engagement in health-promoting behaviors. Sellers, Bolendar, and Crocker (2010) also examined beliefs about aging qualitatively in a sample of older adults. They found that some older adults believed that decline in physical health was unavoidable and a part of the aging process, further believing that that they could not maintain their health regardless of attitude. By better understanding how expectations regarding aging influence health behaviors and outcomes, we can be better informed on how to best intervene in older adult populations, so that they can live healthier more satisfied lives.

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http://dx.doi.org/10.1016/0022-3956(82)90033-4

Appendix

Table 7

Total and Subscale Scores for the GDS, ERA-38, HPLP-II, and RAND-36 (N=161)

Survey	Total and Subscale Scores	Number of Items	Mean	SD	Range	Cronbach's Alpha
GDS	Total	30	3.79	3.76	0-17	0.821
ERA-38	Total	38	50.00	10.00	24.67-82.39	0.943
	General Health	5	50.00	10.00	30.52-79.67	0.811
	Cognitive Functioning	4	50.00	10.00	28.47-80.80	0.784
	Mental Health	12	50.00	10.00	25.01-67.30	0.897
	Functional Independence	5	50.00	10.00	25.29-84.14	0.728
	Sexual Functioning	2	50.00	10.00	38.90-77.61	0.759
	Pain	2	50.00	10.00	34.09-83.35	0.575
	Urinary	1	50.00	10.00	16.59-60.32	
	Sleep	2	50.00	10.00	29.21-65.14	0.867
	Fatigue	4	50.00	10.00	30.91-83.22	0.808
	Appearance	1	50.00	10.00	35.85-71.64	
HPLP-II	Total	52	2.92	0.45	1.65-3.96	0.938
	Health Responsibility	9	2.73	0.61	1.33-4.00	0.826
	Physical Activity	8	2.58	0.74	1.00-4.00	0.840
	Nutrition	9	2.91	0.53	1.56-4.00	0.742
	Spiritual Growth	9	3.19	0.57	1.67-4.00	0.857
	Interpersonal Relations	9	3.22	0.51	1.89-4.00	0.819
	Stress Management	8	2.86	0.52	1.75-4.00	0.729
RAND-36	General Health	5	76.74	16.05	25.00-100.00	0.746
	Physical Functioning	10	76.89	21.20	15.00-100.00	0.880
	Limitations due to Physical Health	4	72.83	36.05	0.00-100.00	0.841
	Limitations due to Emotional Problems	3	86.96	27.93	0.00-100.00	0.794
	Energy and Fatigue	4	65.90	18.36	0.00-100.00	0.855
	Emotional Wellbeing	5	85.39	11.85	36.00-100.00	0.704
	Social Functioning	2	87.73	18.46	25.00-100.00	0.633
	Pain	2	79.08	17.04	10.00-100.00	0.722